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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,123	11/26/2003	Michihiro Shibata	Q78700	4843

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EXAMINER	
JOLLEY, KIRSTEN	
ART UNIT	PAPER NUMBER
1762	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/722,123	SHIBATA, MICHIHIRO	
	Examiner	Art Unit	
	Kirsten C. Jolley	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-5 and 7-14* is/are pending in the application.

4a) Of the above claim(s) *12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-5,7-11,13 and 14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/15/06,12/14/16,1/3/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 3, 2007 has been entered.

Response to Arguments

2. Applicant's arguments filed January 3, 2007 have been fully considered but they are not persuasive.

Applicant argues that Shiau et al., and Arioka in combination with Shiau et al., at best suggest a technique wherein the dye solution is dispensed on the substrate while rotating the substrate at 1,500 to 2,500 rpm, and then the rotation speed of the substrate is maintained at 1,000 to 1,500 rpm, and finally the substrate is rotated at 3,000 to 5,000 rpm. Therefore Applicant argues that the range of the rotation speed at the time of applying the dye solution in the invention does not overlap the range of Shiau et al. (1,500 to 2,500 rpm), and the range of the rotation speed during the low-speed rotation step is also different from that of Shiau et al., and thus the claimed process is clearly different from the combination of Arioka and Shiau et al. This is not convincing to the Examiner. While Shiau et al. does not specifically disclose use of a speed within the claimed range during the dispensation step, the Examiner maintains that the

spin speeds disclosed in the embodiment described at col. 4, line 63 to col. 5, line 34 are merely exemplary and not limiting. Such is explicitly stated at col. 5, lines 35-37 of Shiau et al. Shiau et al. discloses a general teaching at col. 3, lines 8-17 stating "In another embodiment of the present claimed invention, only a single dispensation of photoresist is used. Then the substrate wafer's rotation speed is reduced to level the deposited photoresist layer. ..." An engineer having ordinary skill in the spin coating art would have recognized that different coating materials and substrates would result in the use of different spin speeds and times, while maintaining the general principles of Shiau et al.'s invention. Further, it is well known in the spin coating art that spin speeds are dependent on a number of factors including the viscosity of the coating solution, smoothness of the substrate, spin times, the desired results such as thickness and degree of uniformity of the coating, etc., and it would have been well within the skill of an ordinary artisan to have determined the optimum spin speeds used in performing the process of Arioka taken in view of Shiau et al. (including the speed during supply) through routine experimentation in the absence of a showing of criticality.

With respect to the concentration of the dye solution (dependent claims 5 and 14), Applicant argues that Arioka discloses in the working examples that the dye solution having a concentration of 5% by mass is used. Applicant states that the concentration of dye claimed is much lower and is neither taught nor suggested by the combination of Arioka and Shiau et al. This argument is not convincing to the Examiner. It is well known that the amount of dye in a dye coating solution is cause effective depending upon the particular application, the desired degree of color, the dye used, the thickness and number of coating layers applied, etc. Thus it remains the Examiner's position that it would have been obvious for one having ordinary skill in

the art to have determined the optimum amount of dye through routine experimentation in the absence of a showing of criticality. It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Claim Rejections – 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3-5, 7-11, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arioka (US 2002/0037366) in view of Shiau et al. (US 5,985,363).

Arioka discloses a method of producing an optical recording medium by coating a dye solution on a substrate by a spin coating method and drying the dye solution to form a dye recording layer. Arioka generally discloses a process where dye solution is dropped on the substrate while the substrate is either stationary or rotating, and then rotating the substrate at a high speed to form a thin film on the surface (paragraph 0039). Arioka also teaches that similar issues and similar processes may be used in coating resist on a wafer in a semiconductor manufacturing process as coating light-absorbing dye in an optical disk manufacturing process (paragraphs 0001 and 0002). With respect to Arioka's process, Arioka teaches that the substrate is a polycarbonate resin substrate having spiral grooves therein (paragraph 0049), as is known in

the optical recording medium art. Arioka lacks the specific details of spin speeds and spin times, and one skilled in the art would have been motivated to look to the prior art for exemplary teachings of specific spin coating process parameters to be used in Arioka's dye solution coating process.

Shiau et al. is cited for its teaching of applying a uniform coating of photoresist solution over a substrate having varying surface topography. Shiau et al. teaches that a conventional process of applying coating material at a low spin speed and then spinning at a faster speed to distribute the coating material results in the appearance of radial striations of uneven coating thickness over the surface (col. 3, lines 51-65). Shiau et al. discloses a method of improved coating uniformity on a substrate surface having varying surface topography using a process of first dispensing coating material while rotating the substrate, then performing a low-speed rotation step of rotating the substrate at a speed lower than a speed at the beginning (and end) of the supply of the coating solution, and then accelerating the spin speed, and then finally decelerating the spin speed again (col. 3, lines 8-17 and col. 4, line 63 to col. 5, line 34). [It is noted that claim 3 only requires that the low-speed rotation step is performed at a speed lower than a speed at the beginning of supply of dye solution *or* than a speed at the end of supply of dye solution.]

It is the Examiner's position that it would have been obvious to one having ordinary skill in the art to have incorporated the teachings of Shiau et al. including the use of a low-speed rotation step after the end of supply of coating solution, in the dye solution coating process of Arioka in order to produce an improved coating uniformity and reduced radial striations since Shiau et al. is similarly related to coating on a substrate having an uneven topography, and

because Arioka discloses that similar issues arise in coating photoresist coatings on semiconductor substrates and dye solutions on optical recording medium substrates.

As to the new limitation that a rotation speed of 400-1000 rpm is used during a period from the beginning of the supply of the dye solution to the end of the supply of the dye solution, the Examiner notes that the spin speeds used in the embodiments in columns 4-5 of Shiau et al. are merely exemplary and not limiting (see col. 5, lines 35-37). One having ordinary skill in the spin coating art would have recognized that different coating materials and substrates would result in different spin speeds and times, while maintaining the general principles of Shiau et al.'s invention discussed in col. 3, lines 8-17. Further, it is well known in the spin coating art that spin speeds are dependent on a number of factors including the coating material viscosity, smoothness of the substrate surface, spin times, the desired results such as coating thickness and uniformity, etc., and it would have been well within the skill of an ordinary artisan to have determined all of the optimum spin speeds used in the process of Arioka taken in view of Shiau et al. (including the speed during supply) through routine experimentation in the absence of a showing of criticality.

As to claim 4, Shiau et al. teaches that the low-speed rotation step starts immediately after the end of supply of its coating solution.

As to claims 5 and 14, Arioka teaches using a dye solution having dye in an amount of 4% (paragraph 0047). However it is the Examiner's position that it would have been obvious for one having ordinary skill in the art to have determined the optimum amount of dye through routine experimentation depending on the particular dye used, the desired dye coloring, etc. in the absence of a showing of criticality.

As to claims 7-9 and 13, it is well known in the spin coating art that the spin speeds and spin times used are optimized through routine experimentation and such is within the skill of an ordinary artisan, depending upon the particular coating solutions used, the desired coating thickness, the size and topography of the substrate, etc., as discussed above. It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

As to claims 10-11, since Arioka is silent with regard to the ambient temperature and relative humidity during its coating operations, it would have been obvious to have performed the coating in Arioka at room temperature and at ambient/normal humidity levels. The claimed temperature and humidity ranges encompass room temperature and ambient/normal relative humidity levels.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yoshihara (US 6,117,486), Matsuura (US 2003/0087535), Lee et al. (US 6,890,595), and Sanada et al. (US 5,989,632) are cited because they disclose the conventionality of a low speed rotation step after the supply of a coating solution in a spin coating process.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C. Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Wednesday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kirsten C Jolley
Primary Examiner
Art Unit 1762

kcj